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⑪ Ⓐ **No.** 990115

㊺ **ISSUED** 760601

(52) **CLASS** 94-9
C.R. CL.

⑲ (CA) CANADIAN PATENT

(54) MANHOLE FRAME

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㉑ **APPLICATION No.** 149,993
㉒ **FILED** 720822

㉚ **PRIORITY DATE** Sweden (10,690/71) 710823 Sweden (5223/72) 720421

No. OF CLAIMS 6

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CCA-274 (2-74)

ABSTRACT OF THE DISCLOSURE

A manhole frame for vaults or wells in roadways, including an inner ring and an outer ring, a removable cover supported by the inner ring, the latter having projections each with a pocket and a tapped bottom wall, bolts adjustably screwed within said bottom wall and resting on horizontal support parts of said outer ring to adjustably raise, lower and incline the inner ring. The outer ring has recesses to receive the projections of the inner ring and has a clearance with the inner ring all around to permit inclination of the inner ring relative to the outer ring. The support parts have vertically extending guide parts adapted to engage the upper part of the vault and center the outer ring relative to the latter.

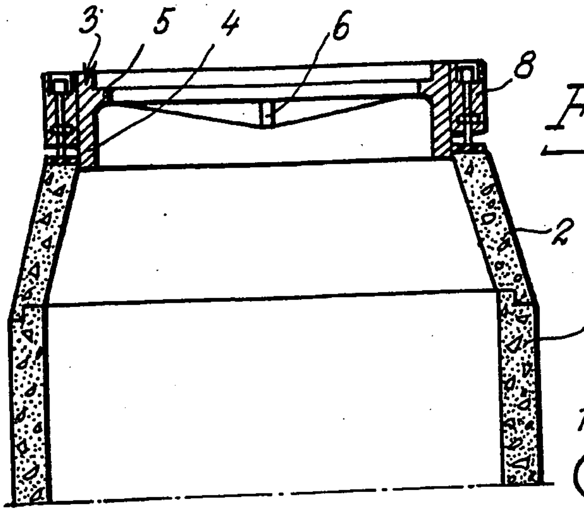

Fig.1

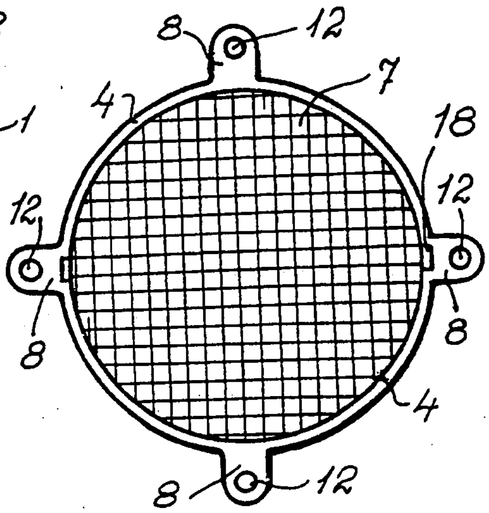

Fig.2

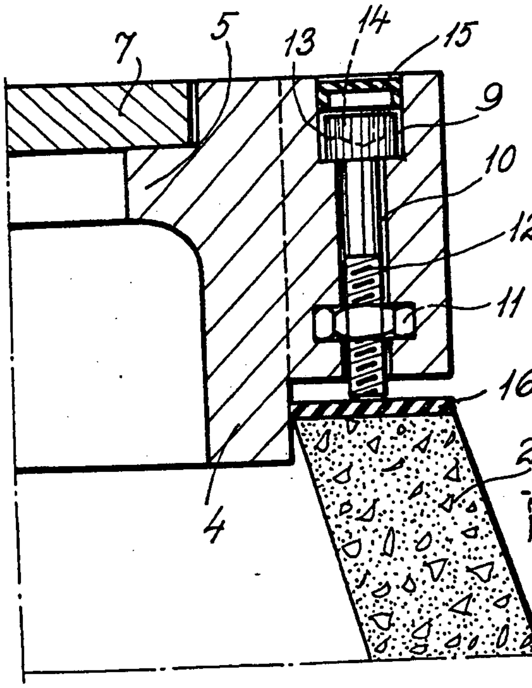

Fig.3

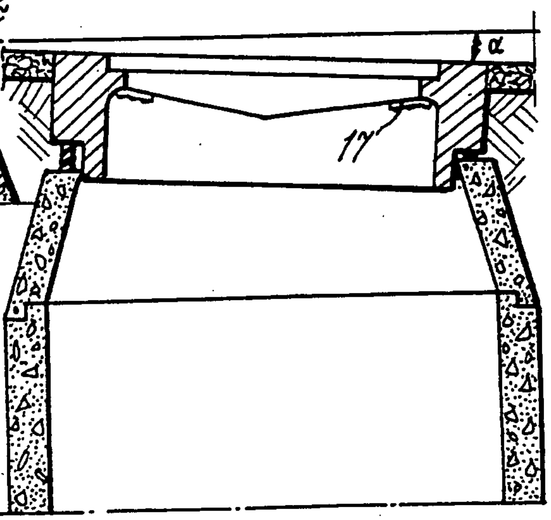

Fig.4

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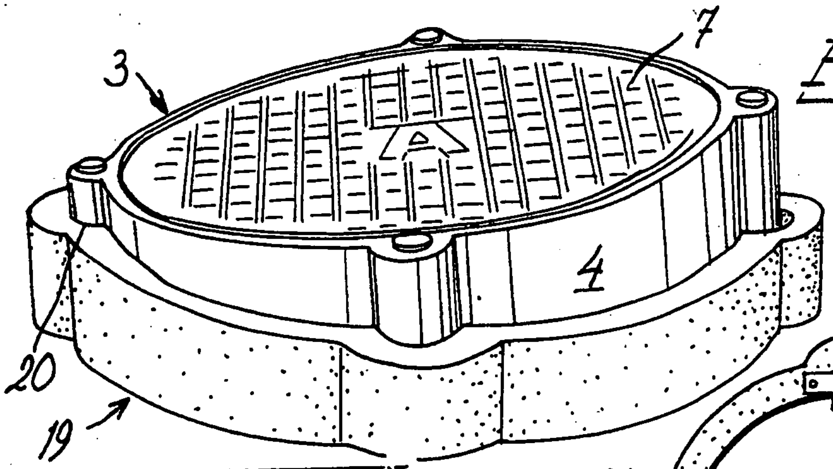

Fig. 5

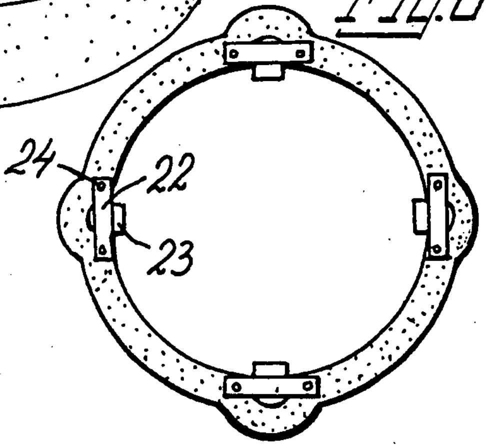

Fig. 6

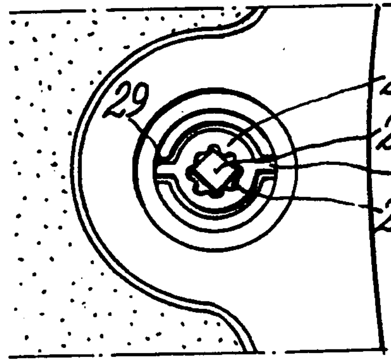

Fig 8

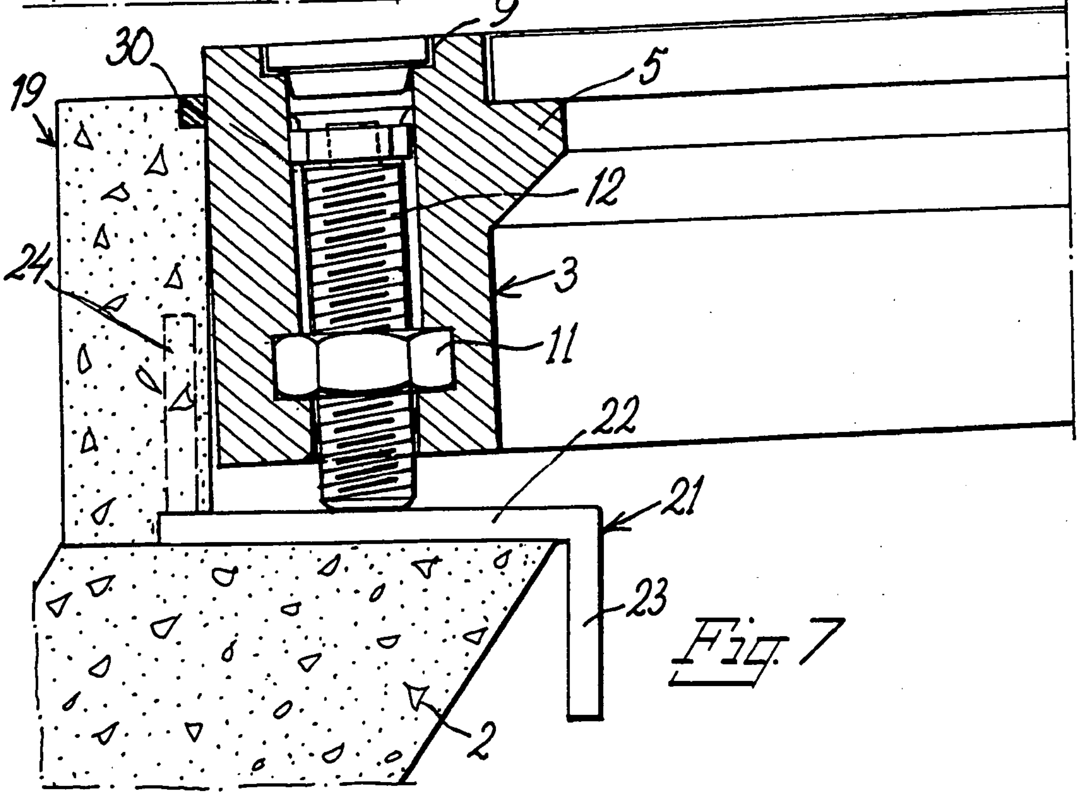

Fig. 7

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This invention refers to a manhole frame, somewhat similar to a manhole frame described and claimed in Applicants' copending application Serial Number 199,098 dated May 6, 1974.

A serious problem in connection with such manhole frames which are located in roadways and the like is to obtain a height which is suitable in relation to the height of the street paving. This problem often arises in connection with resurfacing of streets and highways.

In using the manhole frames now on the market, additional paving material is to be applied under the manhole frame and the upper part of the well ring must be adjusted as to its height to obtain the desired level for the manhole frame. These works are time-consuming and, consequently, expensive.

In order to avoid these drawbacks, it has been suggested to make the manhole frames in two parts, only one of which needs to be supported by additional paving material. The time saving thus obtained has, however, been very limited. It has also been suggested to provide the two parts with threads, thereby enabling the upper part to be adjusted in relation to the lower part, thereby obtaining an adjustment in vertical direction. It is, however, often desired to incline the cover relative to the bedding, in which case the last-mentioned method, of course, cannot be applied.

The main purpose of the invention is to provide a manhole frame which is supported and guided by the upper part of the vault or well ring, which may be inclined relative to the ground and which needs no addition of paving material under the manhole frame.

Reference is made to the accompanying drawings showing two embodiments of the invention and in which:

Figure 1 is a longitudinal section through the upper part of a vault and of a manhole frame according to a first embodiment of the invention;

Figure 2 is a plan view of the cover and inner ring of the manhole frame;

Figure 3 is a partial section through the assembly of Figure 1 on a bigger scale;

Figure 4 is a longitudinal section through the upper part of a vault or well having a manhole cover inclined to follow the shape of the roadway;

Figure 5 shows a second embodiment of the invention in a perspective view and inclined;

Figure 6 is a bottom plan view of the outer ring of the manhole frame according to the second embodiment;

Figure 7 shows on a bigger scale a partial section of the second embodiment and the upper part of the well or vault cooperating therewith; and

Figure 8 is a plan view of one of the lugs or projections of the inner ring having a screw and a locking means for said screw.

Referring to the drawings, numeral 1 designates a concrete tube forming part of the vault or well and numeral 2 designates a frusto-conical concrete tube connected to said first-mentioned tube and forming the upper part of the well. The new manhole frame is generally denoted at 3 and comprises a hollow cylinder 4, preferably made from pig iron, and which, as clearly shown in Figures 1, 3, and 4, has substantially the same external dimension as the opening of the tube 2. Said cylinder 4 is intended to project into said tube 2 and be guided thereby. The cylinder 4 is also provided with an inwardly directed preferably annular portion 5 intended to serve as a guide and support for a cover 7. This cover also has in a manner known per se reinforcements 6. The cylinder 4 further has a number of projections or radially extending lugs 8, the lower end face of which being situated above the lower edge of the cylinder 4 an amount which depends upon the desired maximum height. As appears in Fig. 3, the lugs 8 have such a height that they may receive threaded bolts or adjustment screws. For this purpose, a through hole 10 with an enlarged upper portion 9 and a tapped bottom portion, is provided in each lug. In the lug is molded a nut 11, the thread of which cooperates with the thread of the adjustment bolt 12. Nut 11 constitutes the tapped bottom wall. The head 13 of the adjustment bolt will consequently be housed in the enlarged hole portion 9. Said bolt is preferably of the type having an hexagonal cavity 14. The hole portion 9 may be closed by means of a closure 15 preferably made from a plastic material and intended to prevent water, dirt and the like from entering the hole 10. As appears in Fig. 3, it may be suitable to have the adjustment bolts acting upon supporting plates 16, resting upon the upper concrete tube 2. Of course, it is also possible to provide the supporting plates with parts intended to contact the interior of the concrete tube 2 in those cases where the manhole frame is to be exposed to considerable side loads. In such cases, the outer diameter of the cylinder 3 will slightly be less than the minimum inside diameter of tube 2.

The use of the manhole frame is illustrated in Fig. 4. In order to accommodate the manhole frame to the roadway which in the illustrated case forms the angle α with the horizontal plane, it is only necessary to apply the manhole frame such that it engages the concrete tube 2 whereupon the adjustment bolts--after the closures 15 have been removed--are adjusted by means of an hexagonal spanner such that the upper part of the manhole frame will be flush with the street paving.

It is also desirable to removably secure the cover 7 to the manhole frame. To this end, as shown in Fig. 2, the manhole frame has two diametrically opposed grooves 18, the width of which somewhat exceeding the width of two radially extending elements 17 (See

Fig. 4) secured to the reinformement ribs of the cover and preferably consisting of flat iron details. A bayonet-mount enabling the fastening of the cover by means of a turning movement is thereby obtained.

As will be apparent from the following description, the manhole cover according to the invention is extremely simple to install even by unskilled personnel and may be manufactured at a relatively low price.

In cases where the reduction of the inner diameter which takes place as a consequence of the downwardly protruding cylinder 4 cannot be accepted, the manhole frame construction according to Figures 5-8 may instead be used. Differing from the embodiment according to Figures 1-4, the manhole frame consists of an outer ring 19, preferably made from concrete, and of an inner ring 3 capable of being elevated, lowered and also inclined relative to outer ring 19. Both rings are of substantially equal height. The outer ring 19 is provided with recesses or grooves 20 for receiving the projections or lugs 8 of the inner ring 3 and has combined supporting and guiding means for cooperation with the upper tube 2, including support parts against which the free ends of the adjustment bolts are intended to bear. For this purpose, a number of elements having the general designation 21 are inserted into the outer concrete ring 19 during molding. In the illustrated embodiment, these elements comprise bent flat irons, the horizontal part 22 of which has its underside flush with the underside of the outer ring 19, while its vertical part 23 extends perpendicular thereto in a downwards direction. The element is fastened to the outer ring 19 by means of securing means such as studs 24, or the like, secured to the horizontal part 22 of the element. The elements may also consist of one single part having substantially the shape of a Z.
As appears in Fig. 6, the elements 21 are molded in the parts of the outer ring 19 forming recesses 20 for receiving the lugs 8 of the inner

ring 8. These recesses 20 are somewhat bigger than the corresponding shape of the lugs 8, such that a certain clearance exists between the recesses and the lugs. In a similar manner, the inner diameter of the outer ring 19 somewhat exceeds the outer diameter of the inner ring 3. As appears in Fig. 7, the outer ring 19, as well as support parts 22, are adapted to rest on the top end of upper frusto-conical portion 2 of the well, said well portion 2 having its minor diameter upwards. The inner ring 3 has an inner diameter somewhat exceeding the diameter of the opening of the well portion 2. The adjustment bolts 12 have a square head 25. In order to prevent that the bolts are unscrewed owing to vibrations and the like, there is applied over said square head 25 a locking means 26 which, for the indicated purpose, has a contoured hole 27 cooperating with the square head 25 and two radially extending tongues 28, adapted to fit into radial grooves or slots 29 provided in the lugs 8. Said locking means is preferably made from a plastic material and may, by means of a spiral wound part, be connected to the closure 15 for closing the opening of the lug.

It is evident that the outer ring 19 will always be centered relative to the upper part of the well and that the inner ring 3 can be inclined relative to outer ring 9 within the tolerances between the two rings. From the position shown in Fig. 7, the inner ring may, of course, also be elevated and lowered. Elements 21 not only serve to center but also to correctly locate their parts 22 under adjustment bolts 12. These parts 22 which take up the load from the adjustment bolts and, consequently, the total load upon the manhole frame, are thus always correctly located and need only be dimensioned according to the actual load.

Referring to the embodiment of Figures 1-4, in order to prevent insertion of coarse sand, asphalt or the like between the upper part of the well and the cylinder 4 and also in the threads of the adjustment bolts, it is possible to use segments preferably made from metal sheet material, for bridging the distance between two adjacent lugs. Said segments include a mainly vertical part following the outer envelope surface of the ring from one lug to the next and a horizontal outwardly directed flange adapted to rest against the upper surface of the upper part of the well. These segments are used together with similar segments each embracing a lug. By arranging these segments before filling with coarse sand and asphalt, the space between the upper part of the well and the cylinder will be free from debris.

In the embodiment according to Figures 5-8, a resiliently compressible seal 30 may be fitted in an inside groove formed in the upper part of the outer ring 19. Said seal may be glued to ring 19.

inner ring has an inner diameter approximately corresponding to the diameter of said opening in said vault.

4- A manhole frame as claimed in claim 1, wherein said bolts in their upper end have a non-circular head, locking means of resilient material such as plastics, each having ribs and a part non-turnably embracing one of said heads, and the inner surface of said holes have radial grooves receiving said ribs to prevent unintentional turning of said bolts.

5- A manhole frame as claimed in claim 4, including closures each for closing one of said holes above said bolts.

6- A manhole frame as claimed in claim 1, wherein said outer ring has at its upper part a groove made in the interior surface of said outer ring and a seal in said groove, positioned to contact with the outer surface of said inner ring.